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# Highway Performance Monitoring System Catalog



New Technology  
and Techniques  
Part II Update  
June 2000

Department of Transportation  
Federal Highway Administration (FHWA)  
Office of Highway Policy Information

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## INTRODUCTION

### PURPOSE, USE, CONTENT, AND BACKGROUND OF CATALOG

#### % Audience

The Catalog on HPMS new technologies and techniques is intended for use by:

1. State employees or contractors involved in the preparation of the HPMS submittal.
2. State employees or contractors involved in other data activities from which HPMS data are extracted.
3. FHWA field personnel involved in HPMS.

#### % Purpose

The purpose of the catalog is to create a network to share information on new technologies and techniques for collecting and reporting HPMS data.

#### % Definition

New technology or technique:

Any new technology or technique which the State has employed in the past five years or is currently considering which increases the efficiency, quality, consistency and/or safety of data collection by the State and is used or could be used in the preparation of the annual HPMS submittal to FHWA. Information on current research activities is also included.

#### % Scope

Since much of the data for HPMS comes from other sources and activities, the use of the term HPMS is in the broadest context and includes new technologies and techniques used in these other sources and activities as well as the direct collection and processing of HPMS. For example, if HPMS pavement condition information comes from the State pavement management system and States are using a new technology or technique for the collection of data, they are encouraged to include the activity in the catalog.

## **% Content**

**Part Two** contains individual forms which were prepared by the States. They are sorted by the following categories:

1. Field data collection technique
2. GIS/GPS application for data collection integration and presentation
3. Other data integration and presentation technique
4. Automated data collection equipment
  - 3 pavement characteristics and condition
  - 3 traffic/travel
  - 3 congestion
  - 3 other (specify)
5. Private data sources and privatization of data collection

Each form contains one new technology application or technique. The forms contain the following information:

- % Contact person for the particular new technology application or technique, including organization, name, address, phone, fax, and e-mail
- % Category
- % Description of technology or technique application
- % Description of use or possible use for HPMS. If the project is in the research phase, a description of the research project is included.
- % Results of the use in terms of improved efficiency, quality, consistency, safety of data collection and other benefits.

Each form contains enough information to allow users to make decisions on which States to contact if they want to obtain additional information on a particular technology or technique or to share information on experiences. The purpose of the catalog is to create a network to share information.

## **% Background**

This catalog was prepared as part of the FHWA initiative to reassess the current HPMS. It was designed so that it could be periodically updated and supplemented. States are encouraged to update their submittals and add new entries.

**New or modified forms should be sent to: Robert Rozycki, Office of Highway Policy Information - HPPI-20, Federal Highway Administration, 400 Seventh Street, SW, Washington, DC 20590, or [robert.rozycki@fhwa.dot.gov](mailto:robert.rozycki@fhwa.dot.gov).**

<b>PART TWO</b>
<b>HPMS NEW TECHNOLOGIES AND TECHNIQUES FORMS (listed by category)</b>

**FHWA Data Collection Techniques**

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Hawaii		Agency: Department of Transportation	
Contact: Goro Sulijoadikusumo		Title: CE III	
Street Address: 600 Kapiolani Boulevard			
City: Honolulu		State: Hawaii	Zip Code: 96813
E-Mail:		Phone: 808-587-1839	Fax: 808-587-1787
CATEGORY			
X	Field Data Collection Technique		
X	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
		Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		
<b>Description of Technology or Technique Application:</b> Logging of digital images of the highway system. The system collects full-frame, high resolution, geo-referenced images of the road. The images and reference data are stored in the standardized Joint Photographic Expert Group (JPEG) compression format.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> Extracting HPMS data from the video logging system such as curves, grades, number of lanes, and possibly lane widths. The video logging system can also provide data for the linear referencing system required for the HPMS.			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> The system provides verification of the HPMS data currently recorded. It also provides data that are difficult to obtain, data currently only on project plans. The accuracy of the data will be greatly improved.			

## HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maine	Agency: DOT	
Contact: Edward C. Beckwith	Title: HPMS Coordinator	
Street Address: Management Systems Div., 16 State House Station, Department of Transportation Building		
City: Augusta	State: Maine	Zip Code: 04333-0016
E-Mail: edward.beckwith@state.me.us	Phone: 207-287-4662	Fax: 207-287-3292

### CATEGORY

X		Field Data Collection Technique
		GIS/GPS application for Data Collection Integration and Presentation
		Other Data Integration and Presentation Technique
X		Automated Data Collection Equipment
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
		Private Data Sources and Privatization of Data Collection

**Description of Technology or Technique Application:**

Since June of 1998 the Department has been using an ARAN (Automatic Road Analyzer) van to collect PCR and IRI data on the State Highway and State Aid Highway systems. The van automatically collects rut and ride data ( Type I ). Video cameras collect pavement data, which is post processed by a technician to determine PCR assignments. In addition to pavement cameras the van is equipped with forward, right, and left looking cameras to pick up inventory and right of way data. The data collected by these cameras has proved helpful in updating of inventory and roadway alignments.

**Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):**

The International Roughness Index (IRI) and Pavement Condition Rating (PCR) after being post processed is loaded into the pavement management database. Annually this data is run through routines to update our primary transportation database. Our HPMS non-sampled sections are generated from this data. The sample sections are then updated using a batch update file.

**Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):**

The data gathered is analyzed to assign a Pavement Condition Rating (PCR), predict future deterioration, and make recommendations on where pavement expenditures should be made. This data is also used to update our HPMS section data.

## HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Montana	Agency: Department of Transportation	
Contact: Denise Moudree	Title: Planner	
Street Address: 2701 Prospect Avenue, PO Box 201001		
City: Helena	State: Montana	Zip Code: 59620-1001
E-Mail: Dmoudree@state.mt.us	Phone: 406-444-7294	Fax: 406-444-7671

### CATEGORY

X	Field Data Collection Technique
	GIS/GPS application for Data Collection Integration and Presentation
	Other Data Integration and Presentation Technique
	Automated Data Collection Equipment
	Pavement Characteristics and Condition
	Traffic/Travel
	Congestion
	Other (specify)
	Private Data Sources and Privatization of Data Collection

**Description of Technology or Technique Application:**

The Montana Department of Transportation (MDT) contracted with Mandli Communications to digilog (logging of digital images) and collect road inventory data. Mandli collected images on all of Montana's Interstate, non-Interstate NHS, primary and secondary roads. MDT is pursuing the use of GPS on our HPMS sample sites in coordination with our mapping section. A target data for implementation has not yet been established.

**Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):**

MDT employees are able to "drive" Montana's roadways from their computer. We will be using the digital images to fulfill some of the HPMS inventory requirements.

**Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):**

Because of the size of Montana, data collection is a very time consuming and costly task. The digital images will save the MDT both time and money plus inventorying can be done in the winter months as well as the summer.

## HPMS NEW TECHNOLOGY AND TECHNIQUES

State: New Jersey		Agency: New Jersey Department of Transportation	
Contact: Anthony M. Varone		Title: Project Engineer	
Street Address: 1035 Parkway Ave. Trenton, N. J. 08625			
City: Trenton		State: N.J.	Zip Code: 08625
E-Mail: AnthonyVarone@dot.state.nj.us		Phone: 609-530-3503	Fax: 609-530-3514

### CATEGORY

x	Field Data Collection Technique								
	GIS/GPS application for Data Collection Integration and Presentation								
	Other Data Integration and Presentation Technique								
	Automated Data Collection Equipment								
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td> <td style="padding: 5px;">Pavement Characteristics and Condition</td> </tr> <tr> <td></td> <td style="padding: 5px;">Traffic/Travel</td> </tr> <tr> <td></td> <td style="padding: 5px;">Congestion</td> </tr> <tr> <td></td> <td style="padding: 5px;">Other (specify)</td> </tr> </table>		Pavement Characteristics and Condition		Traffic/Travel		Congestion		Other (specify)
	Pavement Characteristics and Condition								
	Traffic/Travel								
	Congestion								
	Other (specify)								
	Private Data Sources and Privatization of Data Collection								

**Description of Technology or Technique Application:**

Road inventory data regarding HPMS sample sections is collected with the use of a laptop listing all data items for HPMS. Software used for data collection was developed in a Paradox format.

**Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):**

Data items for HPMS are updated through the use of a laptop computer and are then downloaded to the office once all sample sections are completed. Information/data is then processed and analyzed through FHWA software in order to meet the requirements for the HPMS submittal.

**Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):**

Data collection is now more efficient, faster and with less errors due to the computerized collection process.

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Tennessee		Agency: Department of Transportation	
Contact: Steve Allen		Title: Transportation Manager 1	
Street Address: Suite 1000, James K. Polk Building, 505 Deaderick Street			
City: Nashville		State: Tennessee	Zip Code: 37243-0344
E-Mail: sallan@mail.state.tn.us		Phone: 615-741-6741 (Allen)	Fax : 615-532-0353
CATEGORY			
X	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
		Pavement Characteristics and Condition	
	X	Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		
<b>Description of Technology or Technique Application:</b> The University of Tennessee is reviewing Tennessee's random sampling of local roads for statistical accuracy.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> Provides local counts for developing local VMT.			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> The local sample data provides HPMS requirements and VMT for use in the Department.			

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Vermont		Agency: Transportation	
Contact: Michael Hedges		Title: Pavement Management Engineer	
Street Address: 1 National Life Drive			
City: Montpelier		State: Vermont	Zip Code: 05633-5001
E-Mail: michael.hedges@state.vt.us		Phone: 802-828-2793	Fax: 802-828-2848
CATEGORY			
X	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
	X	Pavement Characteristics and Condition. <b>IRI L&amp; RWP, Rut depth, fatigue, Trans Cracks.</b>	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection. <b>Have always used data collection consultant.</b>		
<b>Description of Technology or Technique Application:</b> Automated distress and IRI and Rut data collection as part of PMS network level survey. Deighton dRoad and dMap PMS Arc View GIS. In previous years, have used IMS Laser Pave system. For 2000-2003, Roadware Wisecrux.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> IRI data is provided to HPMS group via MS Excel file.			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b>			

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Vermont		Agency: Transportation	
Contact: Amy Gamble		Title: Traffic Research Engineer	
Street Address: 1 National Life Drive			
City: Montpelier		State: Vermont	Zip Code: 05633-5001
E-Mail: <a href="mailto:amy.gamble@state.vt.us">amy.gamble@state.vt.us</a>		Phone: 802-828-2685	Fax: 802-828-5742
CATEGORY			
X	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
		Pavement Characteristics and Condition	
	X	Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		
<b>Description of Technology or Technique Application:</b> Volume data from the long-term counters is read into laptop computers in the field. Weigh-in-Motion (WIM) data is collected using modems. The WIM and other long-term data are processed using IRD and TransPlus software and are then processed into reports and electronic files using Basic-language programs developed in house. The AADT's are read into a HPMS spreadsheet; where counts are not available AADT estimates are projected from previous data.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b>			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> This system will soon be replaced or supplemented by a TMS being developed for the New England states by GisTrans. This will facilitate access to existing data by accumulating it into one system and associating it with GIS maps.			

<b>PART TWO</b>
<b>HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)</b>

**GIS/GPS Application for  
Data Collection Integration and Presentation**

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Arkansas		Agency: AHTD	
Contact: Mark A. Evans		Title: Transportation Engineer	
Street Address: 10324 Interstate 30			
City: Little Rock		State: Arkansas	Zip Code: 72209
E-Mail: <a href="mailto:MAEP033@ahtd.state.ar.us">MAEP033@ahtd.state.ar.us</a>		Phone: (501) 569-2192	Fax: (501) 569-2070
CATEGORY			
	Field Data Collection Technique		
X	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
		Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		
<b>Description of Technology or Technique Application:</b> We are investigating the use of GPS equipment with the AHTD's Automatic Road Analyzer (ARAN) unit. In conjunction with spatial analysis software we should be able to "lock down" locations and points shared by various databases. This should allow for seamless integration of data.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> Using geographic coordinates provided by the GPS, the Department could more accurately link the databases that provide data for the HPMS.			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> The use of GIS/GPS technology could provide more accurate data, with regards to location, than is currently available to the HPMS.			

## HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Colorado		Agency: Department of Transportation	
Contact: Tim Baker		Title: Unit Manager	
Street Address: 4201 E. Arkansas Avenue			
City: Denver		State: Colorado	Zip Code: 80222
E-Mail: Tim.J.Baker@dot.state.co.us		Phone: 303-757-9805	Fax: 303-757-9727

### CATEGORY

X	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
Private Data Sources and Privatization of Data Collection		

**Description of Technology or Technique Application:**

A systematic review of HPMS samples that includes the additional collection of G.P.S. information and a digital camera picture of various locations within the sample, with at least one picture taken in the general location where the traffic count is being conducted.

**Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):**

The project allows GIS mapping of the sample locations and some additional special querying capacity by linking files to the HPMS database. In addition, we are using this as a quality control component for HPMS by storing various pictures of the location in order to document changes in the sample, provide field staff with an approximate appearance of the sample and provide a pictorial record of the count area for future data collection integrity.

**Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):**

Improved data quality through systematic review of sample data by conducting a thorough review of existing data. Ability to spatially display HPMS data via GIS software and provide a pictorial record of samples that can be used to verify data without the need for immediate field review.

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Connecticut		Agency: Transportation	
Contact: Angelo Asaro		Title: Transportation Supervising Planner	
Street Address: 2800 Berlin Turnpike, P.O. Box 317546			
City: Newington		State: Connecticut	Zip Code: 06131-7546
E-Mail: Angelo.Asaro@po.state.ct.us		Phone: (860) 594-2107	Fax: (860) 594-2056
CATEGORY			
	Field Data Collection Technique		
X	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
		Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		
<b>Description of Technology or Technique Application:</b> The Connecticut Department of Transportation uses GIS software to generate various roadway network maps illustrating HPMS sections and related data.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> These maps provide the HPMS field crews with a graphic representation of the beginning and ending of each section on the state roadway network. Also, maps are created showing various roadway characteristic data (i.e. IRI, ADT's, Functional Classification, etc.) on HPMS sections.			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> These graphic representations of the HPMS system provide the field crews a more efficient method of locating the sections. The HPMS roadway characteristic maps are used by the office personnel for various data analyses and presentations.			

HPMS NEW TECHNOLOGY AND TECHNIQUES		
State: Florida		Agency: Department of Transportation
Contact: Gordon Morgan		Title: Manager, Highway Data Section
Street Address: 605 Suwannee Street, M.S. 27		
City: Tallahassee	State: FL	Zip Code: 32399-0450
E-Mail: gordon.morgan@dot.state.fl.us	Phone: (850) 414-4730	Fax: (850) 488-4752
CATEGORY		
	Field Data Collection Technique	
X	GIS/GPS application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	
<b>Description of Technology or Technique Application:</b> Florida DOT uses GIS to plot data values and HPMS sample locations directly from our database.		
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> By showing the data on maps, it is often easier to spot inconsistent or inappropriate data. Plotting the sample locations makes it unlikely that a sample will be overlooked for data collection.		
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> Data are of higher quality and more consistent after they are reviewed on maps. Efficiency of data collection is improved by planning data collection using accurate and up-to-date sample location maps.		

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Florida		Agency: Department of Transportation	
Contact: Gordon Morgan		Title: Manager, Highway Data Section	
Street Address: 605 Suwannee Street. M.S. 27			
City: Tallahassee		State: FL	Zip Code: 32399-0450
E-Mail: gordon.morgan@dot.state.fl.us		Phone: (850) 414-4730	Fax: (850) 488-4752
CATEGORY			
	Field Data Collection Technique		
X	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
		Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		
<b>Description of Technology or Technique Application:</b> Florida DOT plans to use GPS and aerial photography to obtain geographic alignment and location data.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> A research project is underway to determine the feasibility of integrating GPS and aerial photography data collection with the more traditional methods.			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> Data are expected to be of higher quality and more consistent. The data collection also promises to be more efficient, especially on a large scale.			

## HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Iowa	Agency: Department of Transportation	
Contact: Peggi Knight	Title: Trans. Eng. Mgr.	
Street Address: 800 Lincoln Way		
City: Ames	State: Iowa	Zip Code: 50010
E-Mail: Pknight@max.state.ia.us	Phone: 515-239-1380	Fax: 515-239-1828

### CATEGORY

	Field Data Collection Technique
X	GIS/GPS application for Data Collection Integration and Presentation
	Other Data Integration and Presentation Technique
	Automated Data Collection Equipment
	Pavement Characteristics and Condition
	Traffic/Travel
	Congestion
	Other (specify)
	Private Data Sources and Privatization of Data Collection

**Description of Technology or Technique Application:**

Integrating HPMS Data Source (Base Record) with CADD maps to create a GIS for maintenance of the data. This will allow the Department of Transportation (DOT) to better integrate HPMS data with other transportation data (accident locations, roadside feature inventories, etc.) maintained by the DOT.

**Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):**

The HPMS data will be maintained in the GIS system and exported to the PC HPMS program for preparation of submittal.

**Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):**

Has eliminated duplication of effort in maintaining data on maps and base record data separately.

## HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Maine	Agency: DOT	
Contact: Edward C. Beckwith	Title: HPMS Coordinator	
Street Address: Management Systems Division, 16 State House Station, Dept. of Transportation Building		
City: Augusta	State: Maine	Zip Code: 04333-0016
E-Mail: edward.beckwith@state.me.us	Phone: 207-287-4662	Fax: 207-287-3292

### CATEGORY

		Field Data Collection Technique
X		GIS/G.P.S. application for Data Collection Integration and Presentation
X		Other Data Integration and Presentation Technique
		Automated Data Collection Equipment
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
		Private Data Sources and Privatization of Data Collection

**Description of Technology or Technique Application:**

The Department now employs a GIS-Linked Data warehouse entitled TIDE which stands for Transportation Information for Decision Enhancement. The system contains Administrative, Pavement Management, Inventory, Safety, Bridge, Geometric and Speed Zone data on all public and some private roads. The data is accessed using GQL and the results can be displayed in table form or the results passed to arcview to create maps.

**Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):**

The TIDE has proven helpful in locating HPMS sample sections and relating data elements for editing and updating purposes.

**Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):**

TIDE provides user-friendly access to the departments transportation data. TIDE enables the casual user to develop custom queries to retrieve data without the need for a programmer's assistance. This has increased efficiency by reducing the time required to access data, and reduced the pressure on limited programmer resources.

HPMS NEW TECHNOLOGY AND TECHNIQUES		
State: Maine		Agency: DOT
Contact: Edward C. Beckwith		Title: HPMS Coordinator
Street Address: Management Systems Division, 16 State House Station, Dept. of Transportation Building		
City: Augusta	State: Maine	Zip Code: 04333-0016
E-Mail: edward.beckwith@state.me.us	Phone: 207-287-4662	Fax: 207-287-3292
CATEGORY		
X	Field Data Collection Technique	
X	GIS/G.P.S. application for Data Collection Integration and Presentation	
	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	
<b>Description of Technology or Technique Application:</b> Portable GPS equipment used to gather centerline and attribute information.		
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> Information is used to update mainframe inventory database and the Department's GIS base maps.		
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> This method is both more efficient and more accurate. The Department is also participating in the State's E911 effort, which is also using GPS technology.		

## HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Virginia	Agency: Department of Transportation	
Contact: Dan Widner	Title: GIS Program Manager	
Street Address: 1401 East Broad Street		
City: Richmond	State: VA	Zip Code: 23219
E-Mail: widner_dk@vdot.state.va.us	Phone: 804-786-6762	Fax: 804-692-0958

### CATEGORY

X	Field Data Collection Technique
X	GIS/GPS application for Data Collection Integration and Presentation
	Other Data Integration and Presentation Technique
	Automated Data Collection Equipment
	Pavement Characteristics and Condition
	Traffic/Travel
	Congestion
	Other (specify)
	Private Data Sources and Privatization of Data Collection

#### **Description of Technology or Technique Application:**

The Virginia Department of Transportation is in the process of updating its GIS base map centerlines from an accuracy of +/- 40 feet to +/- 2 meters. This is being done through a combination of technology that includes GPS, inertial navigation, and terrestrial photogrammetric means using photolog images. The data collection effort will occur over the next 2 years on a statewide basis. At present, a 3 county pilot is underway. The subsequent centerlines will be made available through a web-enabled enterprise GIS, allowing for the linking of business and spatial data.

#### **Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):**

The new centerlines will be linked to the legacy database information where the HPMS report data originates. The legacy database's link-node LRS will be available through a linear reference translator that will translate the link-node LRS into route-milepost and/or geographic latitude/longitude. Accessibility to the translator is dependent on the 3 county pilot described above.

#### **Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):**

The results will provide improvements in the currency and accuracy of the data being reported and accessibility to the data.

<b>PART TWO</b>
<b>HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)</b>

**Other Data Integration and Presentation Technique**

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Arkansas		Agency: AHTD	
Contact: Bobby Bradshaw		Title: Research Information Coordinator	
Street Address: 10324 Interstate 30			
City: Little Rock		State: Arkansas	Zip Code: 72209
E-Mail: <a href="mailto:BJBP001@ahtd.state.ar.us">BJBP001@ahtd.state.ar.us</a>		Phone: (501) 569-2071	Fax: (501) 569-2070
CATEGORY			
	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
X	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
		Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		
<b>Description of Technology or Technique Application:</b> The Department is currently implementing a Multimedia-based Highway Information System (MMHIS). The MMHIS will provide full motion Right-of-Way imagery of the State's Interstate and other NHS highways with links to data pertaining to the section of roadway displayed.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> The HPMS data could possibly be linked to the MMHIS.			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> If the implementation of the MMHIS is successful and HPMS data is linked to the image, it would provide a means for Department personnel to view the HPMS data along with the image of the corresponding roadway.			

HPMS NEW TECHNOLOGY AND TECHNIQUES		
State: Florida		Agency: Department of Transportation
Contact: Gordon Morgan		Title: Manager, Highway Data Section
Street Address: 605 Suwannee Street, Mail Stop 27		
City: Tallahassee	State: Florida	Zip Code: 32399-0450
E-Mail: gordon.morgan@dot.state.fl.us	Phone: 850-414-4730	Fax: 850-488-4752
CATEGORY		
	Field Data Collection Technique	
	GIS/GPS application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
	Private Data Sources and Privatization of Data Collection	
<b>Description of Technology or Technique Application:</b> A Florida DOT contractor obtains videolog images of the State Highway System, in both directions, at 0.01 mile intervals. The images are stored and distributed on CD-ROMs. They are also put onto a large hard disk and made available to any Florida DOT employee using a browser on our intranet.		
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> Quality control on many HPMS data items can be performed by reviewing the videologs rather than by making field investigations.		
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> Using videologs improves the efficiency and safety of data review. This has the additional effect of encouraging more frequent reviews, thus improving data quality.		

## HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Kansas	Agency: Kansas DOT.--Bureau of Transportation Planning	
Contact: Robert Fuller	Title: Road Systems Engineer	
Street Address: Docking State Office Building, 8th floor		
City: Topeka	State: Kansas	Zip Code: 66612-1568
E-Mail: <a href="mailto:rfuller@ksdot.org">rfuller@ksdot.org</a>	Phone: 785-296-5130	Fax: 785-296-8168

### CATEGORY

		Field Data Collection Technique
		GIS/G.P.S. application for Data Collection Integration and Presentation
X		Other Data Integration and Presentation Technique
		Automated Data Collection Equipment
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
		Private Data Sources and Privatization of Data Collection

**Description of Technology or Technique Application:**

Kansas is currently converting from a mainframe, flat file, batch environment to a client/server environment and relational database for transportation data entry and processing. Kansas has contracted to use the Exor Highways product as a basic platform for its geometric data processing and is customizing the product for Kansas-specific needs. As part of this migration, a standard LRS ID is being developed to provide the link between various agency databases and the base map.

**Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):**

The client/server environment will greatly increase access to data in the state system inventory database. It will facilitate batch updating of the HPMS database for the annual submittal of data. A unified LRS key will link various agency databases and the HPMS inventory database to the base map further enhancing the statewide GIS.

**Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):**

Kansas anticipates improvement in efficiency of HPMS database maintenance will translate into increased data integrity through a reduction of system complexity and increase in system flexibility. A unified LRS key will allow graphical display of HPMS data for error checking and data quality reporting.

HPMS NEW TECHNOLOGY AND TECHNIQUES		
State: Tennessee		Agency: Department of Transportation
Contact: Tom Eldridge/Gatha McCollum		Title: Information Systems Supervisor/HPMS Coordinator
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City: Nashville	State: Tennessee	Zip Code: 37243-0334
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CATEGORY		
	Field Data Collection Technique	
	GIS/G.P.S. application for Data Collection Integration and Presentation	
X	Other Data Integration and Presentation Technique	
X	Automated Data Collection Equipment	
		Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
	X	Other (specify)
	Private Data Sources and Privatization of Data Collection	
<b>Description of Technology or Technique Application:</b> A digital photolog is linked to the highway database. Tennessee Department of Transportation has indexed its highway inventory with the location along the roadway. This links the photolog data with all of the other data and the GIS.		
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> Photos are used to aid in inventory of signing, speed zones, sight distance, intersection inventory, and other inventory items.		
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> There is less field inventory needed which makes data collection safer and more efficient.		

<b>PART TWO</b>
<b>HPMS NEW TECHNOLOGIES AND TECHNIQUES— FORMS (listed by category)</b>

**Automated Data Collection Equipment**

**a. Pavement Characteristics and Condition**

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Kansas		Agency: Depart of Trans, Bureau of Materials & Research	
Contact: Rick Miller		Title: Assistant Geotechnical Engineer	
Street Address: 2300 Van Buren			
City: Topeka		State: Kansas	Zip Code: 66611-1195
E-Mail: rick@ksdot.org		Phone: 785-296-3008	Fax: 785-296-2526
CATEGORY			
	Field Data Collection Technique		
	GIS/G.P.S. application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
X	Automated Data Collection Equipment		
	X	Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
	Private Data Sources and Privatization of Data Collection		
<b>Description of Technology or Technique Application:</b> Laser-based automatic fault detection (the vertical movement of two adjacent slabs) using readings from laser profilometer.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> Previously, faulting was a manual, visual survey. Faulting data is an integral part of the Pavement Management System data that Kansas Department of Transportation maintains.			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> Laser-based automatic fault detection provides greater speed of data collection and more objective, consistent, and accurate faulting data.			

## HPMS NEW TECHNOLOGY AND TECHNIQUES

State: Tennessee	Agency: Department of Transportation	
Contact: Donald Reid/Gatha McCollum	Title: Roadway Spec. III/HPMS Coordinator	
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City: Nashville	State: Tennessee	Zip Code: 37243-0334
E-Mail: <a href="mailto:dreid@mail.state.tn.us">dreid@mail.state.tn.us</a> <a href="mailto:Amccollum@mail.state.tn.us">Amccollum@mail.state.tn.us</a>	Phone: 615-741-4894 (Reid) 615-741-1590(McCollum)	Fax: 615-532-8451 (McCollum)

### CATEGORY

		Field Data Collection Technique
		GIS/G.P.S. application for Data Collection Integration and Presentation
		Other Data Integration and Presentation Technique
X		Automated Data Collection Equipment
	X	Pavement Characteristics and Condition
		Traffic/Travel
		Congestion
		Other (specify)
		Private Data Sources and Privatization of Data Collection

**Description of Technology or Technique Application:**

Tennessee is collecting automated pavement distress, IRI, rutting, and crack survey for all of HPMS required systems.

**Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):**

The IRI is being collected in conjunction with the distress for use in the required HPMS program.

**Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):**

This data is residing in Tennessee Department of Transportation's PMS, which is the source for all the HPMS required items.

**PART TWO**

**HPMS NEW TECHNOLOGIES AND TECHNIQUES—  
FORMS (listed by category)**

**Private Data Sources and  
Privatization of Data Collection**

HPMS NEW TECHNOLOGY AND TECHNIQUES			
State: Arkansas		Agency: AHTD	
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E-Mail: <a href="mailto:AKME611@ahtd.state.ar.us">AKME611@ahtd.state.ar.us</a>		Phone: (501) 569-2111	Fax: (501) 569-2476
CATEGORY			
	Field Data Collection Technique		
	GIS/GPS application for Data Collection Integration and Presentation		
	Other Data Integration and Presentation Technique		
	Automated Data Collection Equipment		
		Pavement Characteristics and Condition	
		Traffic/Travel	
		Congestion	
		Other (specify)	
X	Private Data Sources and Privatization of Data Collection		
<b>Description of Technology or Technique Application:</b> We have outsourced the collection of traffic counts, turning movements, and the installation of some Weigh-in-Motion (WIM) sites.			
<b>Description of Use or Possible Use for HPMS (If project is in research phase, describe the research project):</b> Provides traffic data for use in HPMS.			
<b>Results of Use (In terms of improved efficiency, quality, consistency, safety of data collection and other benefits):</b> Outsourcing is cost beneficial to the Department.			